

Transcatheter Closure of Ruptured Sinus of Valsalva Aneurysm from the Right Sinus of Valsalva

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Abstract



A ruptured sinus of Valsalva aneurysm (RSOV) is a rare cardiac anomaly. Traditionally, RSOV were repaired surgically; however, percutaneous transcatheter closure is the current treatment of choice. We report a case of RSOV from the right sinus which was closed with a device. The case was a 28-year-old male who presented to Shahid Gangalal National Heart center with the diagnosis of RSOV from the right sinus. Patients was evaluated with echocardiogram, transesophageal echocardiogram and cardiac CT. Patient underwent successful transcatheter closure of RSOV arising from the right sinus with 16x18mm Cera device.

Keywords: Sinus of Valsalva aneurysm; Ruptured of sinus of Valsalva Aneurysm; transcatheter closure

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Introduction

Ruptured sinus of Valsalva aneurysm (RSOV) typically results in a left-to-right shunt. Ruptured aneurysms originate most frequently from the right coronary sinus (65-85%), less frequently from the non-coronary sinus (10-30%), and rarely from the left coronary sinus (<5%). The right ventricle is the most common receiving chamber (about 80-90%) [1]. Untreated RSOV leads to progressive heart failure and carries a poor prognosis [2]. Surgical repairs has been the standard treatment since 1956 [3] however after the first report on the transcatheter closure (TCC) of RSOV by Cullen et al. in 1994,[4] it has emerged as a safe and effective less-invasive alternative with comparable outcomes and fewer complications [5,6]. Following our previous report of two TCC of non-coronary RSOV from Nepal,[7] we present a case of successful TCC of an RSOV originating from the right coronary sinus.

Case Report

A 28-year-old male was referred with the diagnosis of RSOV for device closure. He had shortness of breath. During the presentation, the patient was comfortable and in fair general condition. Pulse was regular and 80 beats/min. Blood pressure was 110/70 mmHg. Cardiovascular examination revealed: normal precordium, audible first and second heart sounds, continuous murmur, more prominent during diastole. The systemic examination was unremarkable. Transthoracic echocardiography (TTE) revealed: RSOV from right coronary sinus draining into the right ventricle, preserved biventricular systolic function as shown in [Figure 1].

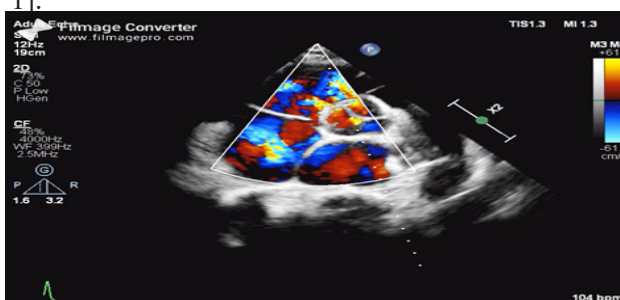


Figure 1. Echocardiogram of RSOV from right sinus

Transesophageal echocardiogram (TEE) confirmed the diagnosis as shown in [Figure 2].

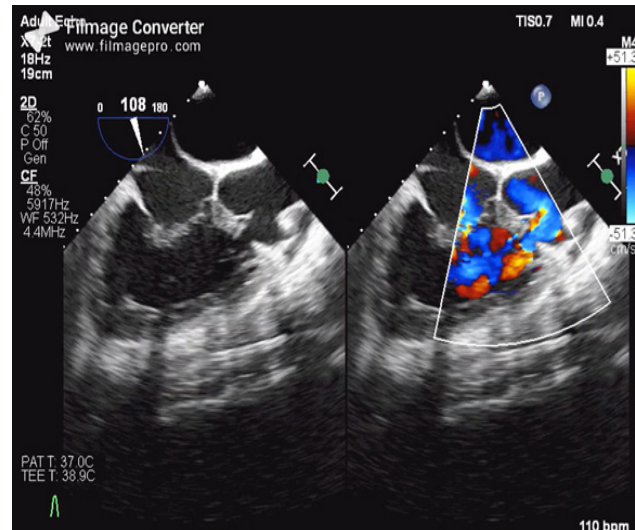


Figure 2. RSOV from right coronary sinus

Cardiac TTE showed a ruptured sinus of Valsalva from RCC to RV with a waist measuring 10.6mm, distance between the RSOV and origin of Right Coronary Artery ostium (RCA) was more than 12mm as shown in [Figure 3].

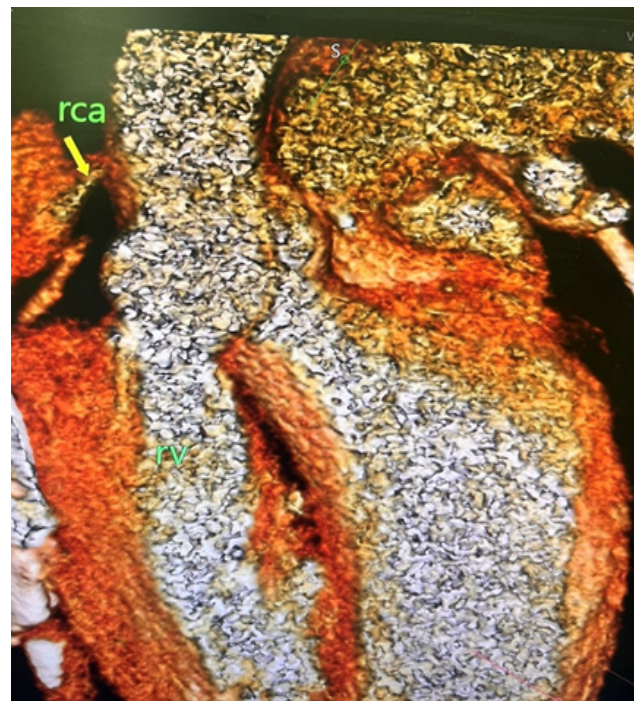


Figure 3. Cardiac CT

The aortogram during the TCC procedure confirmed RSOV from the right sinus with defect size of 11 mm as shown in Figure 4. During the procedure

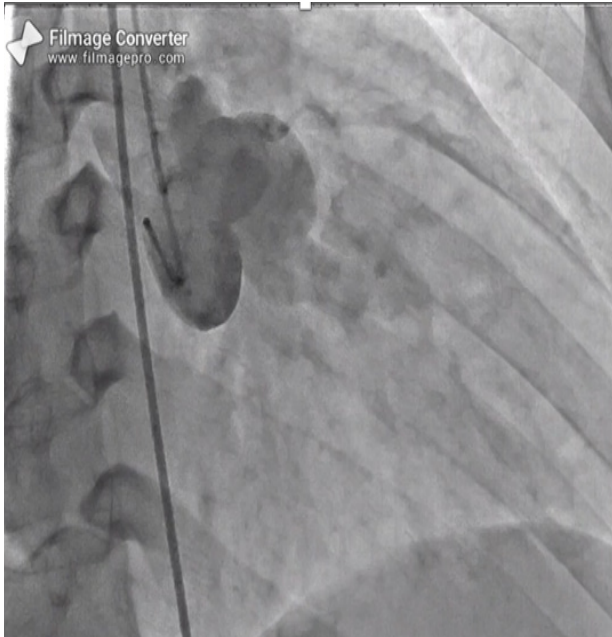


Figure 4. Aortogram

arteriovenous loop was established by snaring the guidewire from the right superior venacava. A Cera™ duct occluder (Life tech 16x18 mm) device was successfully deployed under fluoroscopic and TEE guidance. Post-deployment angiography and TEE demonstrated optimal device position, no residual shunt, free movement of aortic cusps with no evidence of aortic regurgitation.

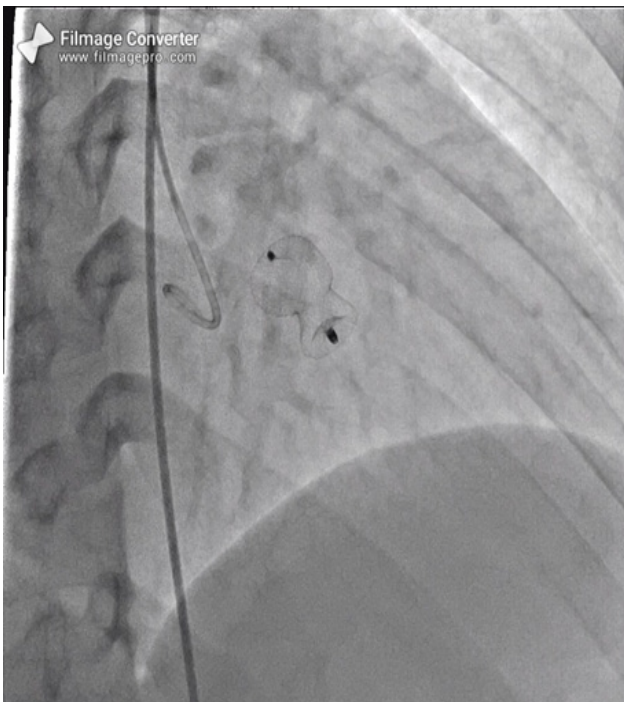


Figure 4. TCC of the RSOV with Cera™ duct occluder (Life tech 16x18 mm)

Discussion

Although surgical procedures are generally acknowledged as the gold standard of treatment for RSOV, TCC has been suggested as an attractive alternative to surgery, [8] The TCC provides good efficacy in the treatment of RSOV as it avoids the risks of open-heart surgery and cardiopulmonary bypass,[9] due to the implementation of sternotomy and cardiopulmonary bypass, associated morbidity is high [3]. Comprehensive guideline on TCC of RSOV indications, patient selection, choice of imaging modalities, device selection, and complication prevention is still lacking.[10] Increasing evidence suggests that the TCC of RSOV is a viable, less invasive alternative [5]. Studies on the TCC of RSOV are limited to case reports and case series, with encouraging short-term and mid-term outcomes [8] but large-scale clinical trials have yet to be performed [11]. Although shown to be effective, the TCC of RSOV can be associated with complications on rare occasions. Complications of TCC of RSOV include device embolization, impingement on aortic valve causing aortic regurgitation, occlusion of coronary ostia, infective endocarditis, [12] hemolysis [4]. Embolization of the occlude device can also be a possible complication due to undersized devices which can be retrieve percutaneously [10]. Hemolysis is also a rare complication of TCC caused by the inserted device [4] mainly due to residual leak.

Compression of the coronary arteries after device insertion can be a life-threatening complication. If left undetected, the condition could cause myocardial infarction. A new onset ST depression after device implantation can also be due to coronary artery compression [10]. As coronary ostia are located quite high in relation to the SOVA, and device impingement of the coronaries is only a theoretical possibility that has never been reported. [8]. In our case as RSOV was from the right sinus, though cardiac CT clearly showed that there is a good distance between the RSOV and the ostium of the RCA, RCA angiogram was done to rule out occlusion of RCA.

As with any percutaneous intervention,

complications associated with catheterization sites, including atrioventricular fistulae, hematoma, and bleeding events, are also possible, [10] but all the Possible complications can be prevented or readily addressed through efficient measures [10].

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Conclusions

TCC of RSOV is a safe and effective treatment option. With our previous experience of closing non-coronary sinus RSOV we were able to close the RSOV with good immediate outcome.

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